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EXAMINER

HOFFBERG, ROBERT JOSEPH

ART UNIT

PAPER NUMBER

2835

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Please find below and/or attached an Office communication concerning this application or proceeding.



***Detailed Action***

***Claim Objections***

1. Claims 1-9 and 29-32 are objected to because of the following informalities: "an opposite second side" in claim 1 can be interpreted as the same side as the "front connecting face". For examination purposes, it is interpret as "an opposite second side other than the front connecting face".
2. Claim 1-9 and 29-32 are objected to because of the following informalities: Claim 1 recites the limitation "the front connecting face". There is insufficient antecedent basis for this limitation in the claim.
3. Claims 1-9 and 29-32 are objected to as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: "the front connecting face" in claim 1; it is not clear how it is connected to remaining structure.

Appropriate correction is required.

***Drawing Objections***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the mounting holes (see Claims 10, 21) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 5-6, 10-11, 14-16 and 20-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification fails to teach how the mounting holes or vias (claims 5, 10, 20 and 21) allow air to flow through while having the power

connector mounted therein. For the purposes of examination, it is assumed applicant has both used vias with connectors mounted therein and unused vias open to allow air flow based upon applicants Fig. 4.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 10 recites the limitation "the circuit board power connector" and "the connector". There is insufficient antecedent basis for this limitation in the claim. It is unclear if applicant intends one or two connectors to be claimed.

9. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Language that suggests or makes optional (i. e. "configured to attach") but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. See MPEP § 2106 [R-3](II)(C).

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1, 3-4, 7, 9, 17-18 and 29-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Pape et al. (US 6,514,103).

With respect to Claim 1, Pape et al. teaches a connector (Fig. 1, #1), comprising: conductors (Fig. 1, #40); and a housing (Fig. 2, #10) substantially enclosing the conductors and including an opening (Fig. 1, bottom of #7) on a first side (Fig. 1, top) other than the front connecting face (Fig. 1, #11), and an opening (Fig. 1, #14) on an opposite second side (Fig. 1, bottom) that together form a passageway (Fig. 1, #7) extending completely through the connector from the first side to the second side for promoting air flow (Fig. 1, #6) across the conductors and through the housing.

With respect to Claim 3, Pape et al. further teaches including openings on opposite sides of the housing for passing air through a first one (Fig. 2, bottom of #7) of the openings, over the conductors in parallel planar passageways (Fig. 1, #7), and out a second one (Fig. 3a, #14) of the openings.

With respect to Claim 4, Pape et al. further teaches including an air flow control device (Fig. 1, channel for #8) configured to direct air into one of the housing openings (Fig. 1, bottom of #7).

With respect to Claim 7, Pape et al. further teaches wherein the air flow control device includes an airtake vent (Fig. 1, bottom of #7) located below (Fig. 1, #8) the housing.

With respect to Claim 17, Pape et al. teaches an air flow control device, comprising: a unit (Fig. 2, #10) for containing a circuit board power connector; an air intake vent (Fig. 1, #13) for directing air into the unit; and an air outtake vent (Fig. 1,

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#16) for directing air out of the unit; and conductors (Fig. 1, #40) arranged to promote air flow (Fig. 1, #5) through the power connector in parallel channels (see Fig. 2 and 3b, multiple #13s and #16s).

With respect to Claim 18, Pape et al. further teaches including openings on opposite sides (see Fig. 1) of the power connector.

With respect to Claim 29, Pape et al. further teaches including parallel airways (see Fig. 2 and 3b, multiple #13s and #16s) formed between the conductors for channeling the air flow.

With respect to Claim 30, Pape et al. further teaches including mounting pins (Fig. 1, #43) oriented perpendicular (see Fig. 1) to the conductors for inserting into a circuit board (Fig. 1, #9).

With respect to Claim 31, Pape et al. further teaches wherein the conductors are stacked (see Fig. 1) in increasing size (Fig. 1, #40 on top is larger than #40 on bottom) from a bottom conductor nearest the circuit board (Fig. 1, #9) to a top conductor.

With respect to Claim 32, Pape et al. further teaches wherein the conductors are arranged as vertically stacked blades (see Fig. 1) spaced apart by horizontal channels (Fig. 1, between 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> rows of #41) extending from the first side of the housing to the second side of the housing, the first and second openings allowing air to pass in through the opening on the first side of the housing, through the horizontal channels over both a top and bottom surface of the vertically stacked conductor blades, and pass out the opening in the second side of the housing (see Fig. 2).

***Claim Rejections - 35 USC § 103***

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12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 2 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) as applied to claim 1 above, in view of Aritani (US 2001/0003685).

With respect to Claim 2, Pape et al. teaches the connector of claim 1 above. Pape et al. does not teach the fins. Aritani teaches including fins (Fig. 2, #26) coupled to the conductors (Fig. 4, #23). With respect to Claim 19, Aritani further teaches an air flow control device according to claim 18 including heat sink fins (Fig. 6, #26) thermally coupled to conductors (Fig. 5, #25) in the power connector (Fig. 6, #11). While Aritani fails to teach the fins extending out of at least one of the housing openings, it would be obvious to one of ordinary skill in the art at the time of the invention was made to position the fins to maximize the air flow for cooling. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Aritani for the purpose of enlarging the surface area of the conductors and position the conductors to maximize heat dissipation.

14. Claims 5-6, 9-11, 14, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) as applied to the above claims, in view of Kramer et al. (US 6,574,108).



With respect to Claim 5, Pape et al. teaches the connector of claim 4 above. Pape et al. fails to teach the vias. Kramer et al. teaches wherein the air flow control device includes an air intake vent (Fig. 3, #110 bottom) configured to direct air from underneath a circuit board up through thermal vias (Fig. 3, #130) electrically connected (Fig. 3, #150) to a circuit board (Fig. 3, #100) and to the component (Fig. 1, #200). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing an air path through the circuit board to cool the connector. Thermal vias in combination with signal vias through a circuit board are conventional in the art as shown by Kramer et al.

With respect to Claim 6, Pape et al. further teaches including conductor pins (Fig. 1, #43) that are inserted in the vias (Col. 3, line 59).

With respect to Claim 9, Pape et al. teaches the connector of the above claims. Pape further teaches the air flow control device with vias inside for air flow (Fig. 1, channel for #8). Kramer et al. teaches vias (Fig. 3, #130) electrically connected to a power plane (Fig. 3, #150) on a printed circuit board (Fig. 3, #100), the vias (Fig. 3, #110) for directing air (see Fig. 3) from underneath the circuit board up through the vias and across the conductors (Fig. 3, #180). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing an air flow path from beneath and passing through the circuit board to cool the connector.

With respect to Claim 10, Pape et al. teaches a circuit board connector (Fig. 1, #1) having electrical contacts (Fig. 1, #40) for inserting into mounting holes (Col. 3, line 59) electrically connected (Col. 3, line 58, soldered) to a circuit board (Fig. 1, #9). Pape et al. fails to teach a device attached over the power connector. Kramer et al. has signal or mounting holes and thermal vias (Fig. 3, #110) to allow air flow from under the circuit board to the components mounted on the top. With respect to the type of connector, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. to provide air flow around any type of connector, especially a power connector which would be a high heat component, for purpose of cooling the component.

With respect to Claim 11, Pape et al. in view of Kramer et al. teaches the heat removal system of claim 10 above. They do not teach the intake vent. Kramer et al. teaches an air intake vent (Fig. 3, #110 bottom) located on an underside (see Fig. 3) of the printed circuit board (Fig. 3, #100) for directing air up through the printed circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing a plenum to direct the air flow to the areas that need to be cooled.

With respect to Claim 14, Pape et al. further teaches including openings in a power connector, the device directing air flow into a first one of the openings (Fig. 1, bottom of #7), through parallel passageways (Fig. 1, #7) formed between conductors (Fig. 1, #40) housed in the connector (Fig. 1, #94 and #95 for power #92), out a second

one of the openings (Fig. 1, #14). Pape et al fails to teach the output vent. Kramer et al. teaches an output vent (Fig. 3, #110 top). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing a exhaust vent for the air flow to exit.

With respect to Claim 21, Pape et al. teaches a method for removing heat comprising: a circuit board (Fig. 1, #9) through electrically coupled mounting holes (Col. 3, line 59) located in the circuit board and circulating the air (Fig. 1, #7) past electrical contacts (Fig. 1, #40) inserted in the electrically coupled (Fig. 3, line 58) mounting holes (Col. 3, line 59). Pape et al. fails to teach the air flow through the circuit board. Kramer et al. teaches directing an air flow from beneath (see Fig. 3) a circuit board (Fig. 3, #100) through thermal vias. Kramer et al. teaches electrically coupled (Col. 3, line 28) mounting holes (Fig. 3, #110) located in the circuit board (Fig. 3, #100). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing an air flow path to maximize the cooling of the connector.

With regard to Claim 24, Pape et al. further teaches circulating the air (Fig. 1, #7) through parallel passageways (Fig. 1, #7) formed between conductors (Fig. 1, #40) located in a power device with electrical contacts.

15. Claims 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) as applied to the above claims, in view of Lee et al. (US 5,995,368).

With respect to Claim 8, Pape et al. teaches the connector of the above claims. Pape et al. does not teach the air flow offset. Lee et al teaches an exhaust vent (Fig. 2, upper right) configured to vent air in a direction offset and substantially parallel (see Fig. 2) to the air directed towards the intake vent (Fig. 2, lower left). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Lee et al. for the purpose of providing an air path that maximizes the cooling of the connector.

16. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103), in view of Kramer et al. (US 6,574,108) as applied in claim 10, above, further in view of Aritani (US 2001/0003685).

With respect to Claim 15, Pape et al. in view of Kramer et al. teaches the heat removal system of the above claims. They do not teach the fins. Aritani teaches fins (Fig. 2, #26) on the conductors (Fig. 4, #23). While Aritani fails to teach fins extending out of at least one of the openings, it would be obvious to one of ordinary skill in the art at the time of the invention was made to position the fins to maximize the air flow for cooling. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. in view of Kramer et al. with that of Aritani for the purpose of enlarging the surface area of the conductors and position the conductors to maximize heat dissipation.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103), in view of Kramer et al. (US 6,574,108) as applied to claim 10 above, in view of Butterbaugh et al. (US 5,630,469).

With respect to Claim 16, Pape et al. in view of Kramer et al. teach a heat removal system according to claim 10, with the exception of a fan located next to the air exhaust for sucking air out of the output vent. Butterbaugh et al teaches a fan (Fig. 2, #30) located next to the air exhaust (Fig. 2, #44) for sucking air (Col. 4, lines 57-58) out of the output vent. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the heat removal system of Pape et al. in view of Kramer et al. with that of Butterbaugh et al. for the purpose that air flow for cooling can be achieved by either expelling or sucking the air over the electrical device.

18. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) as applied to claim 17 above.

With respect to Claim 20, Pape et al. further teaches including conductor (Fig. 1, #43) connections for inserting into vias electrically coupled to a circuit board (Fig. 1, #9) and providing air flow into the unit. While Pape et al. fails to disclose a printed circuit board with a power plane, it does teach the conductors are attached to the circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. for the purpose of providing a power plane and other electrical conductors on the circuit board to permit a electrical paths between the connector and other components.

19. Claims 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) in view of Kramer et al. (US 6,574,108).

With respect to Claim 21, Pape et al. teaches a method for removing heat comprising: a circuit board (Fig. 1, #9) through electrically coupled mounting holes (Col.

3, line 59) located in the circuit board and circulating the air (Fig. 1, #7) past electrical contacts (Fig. 1, #40) inserted in the electrically coupled (Fig. 3, line 58) mounting holes (Col. 3, line 59). Pape et al. fails to teach the air flow through the circuit board. Kramer et al. teaches directing an air flow from beneath (see Fig. 3) a circuit board (Fig. 3, #100) through thermal vias. Kramer et al. teaches electrically coupled (Col. 3, line 28) mounting holes (Fig. 3, #110) located in the circuit board (Fig. 3, #100). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Kramer et al. for the purpose of providing an air flow path to maximize the cooling of the connector.

With regard to Claim 24, Pape et al. further teaches circulating the air (Fig. 1, #7) through parallel passageways (Fig. 1, #7) formed between conductors (Fig. 1, #40) located in a power device with electrical contacts.

20. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103) in view of Kramer et al. (US 6,574,108) as applied to Claim 21 above, further in view of Lee et al. (US 5,995,368).

With respect to Claim 22, Pape et al. in view of Kramer et al. teach the method of claim 21 above. They fail to teach the offset air flow. Lee et al. teaches exhausting (Fig. 2, upper right) the air in a direction parallel and offset (see Fig. 2) to the air flow beneath the circuit board (Fig. 1, #21). Regarding Claim 23, Lee et al. further teaches wherein the air is exhausted above (see Fig. 2) the circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the

connector of Pape et al. in view of Kramer et al. with that of Lee et al. for the purpose of providing an air flow path to maximize the cooling of the connector.

21. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103), in view of Lee et al. (US 5,995,368).

With respect to Claim 25, Pape et al. teaches a connector (Fig. 1, #1), comprising: conductors (Fig. 1, #40), a housing (Fig. 2, #10) containing the conductors. Pape et al fails to teach an air flow control device. Lee et al. teaches an air flow control device (Fig. 2, #14) substantially enclosing the housing (Fig. 2, #35) having an air intake vent (Fig. 2, lower left) on one side for promoting air flow into the housing and further having an exhaust vent (Fig.2, upper right) on another side for exhausting the air flow in a direction offset and substantially parallel (see Fig. 2) to the air now directed towards the air intake vent. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. with that of Lee et al. for the purpose of providing an air flow path to maximize the cooling of the connector.

With respect to Claim 26, Pape et al. further teaches openings (Fig. 1, bottom of #7 and #14) on opposite sides of the housing for passing air through a first one (Fig. 1, bottom of #7) of the openings, over the conductors (Fig. 1, #40) in parallel planar passageways (Fig. 1, #7), and out a second one of the openings (Fig. 1, #14).

22. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pape et al. (US 6,514,103), in view of Lee et al. (US 5,995,368) as applied to the above

claims, further in view of Konstad (US 6,452,797), and further in view of Kramer et al. (US 6,574,108).

With respect to Claim 27, Pape et al. in view of Lee et al. teach the connector of the above claims. They fail to teach that air flow travel through the circuit board. Konstad teaches that the air intake vent (Fig. 4, #26a) is configured to direct air from underneath (see Fig. 4) a circuit board (Fig. 4, #21) up through a via (Fig. 2, #28) in the printed circuit board. While Konstad fails to teach a plurality of vias, it would have been obvious at the time of the invention to have as duplicate the vias to have cross section to obtain the desired air flow to maximize cooling. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Kramer et al. teaches the vias (Fig. 3, #110) electrically (Col. 3, line 28) connected to the circuit board (Fig. 3, #100). Pape et al. further teaches an air flow (Fig. 1 #7) into the first one of the openings (Fig. 1, bottom of #7), and the exhaust vent (Fig. 1, #14) is configured to exhaust the directed air on a top side (see Fig. 1) of the circuit board (Fig. 1, #9) out away from the conductors (Fig. 1, #43). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the connector of Pape et al. in view of Lee et al. with that of Konstad further in view of Kramer et al. for the purpose of providing an air flow path to maximize the cooling of the connector.

With respect to Claim 28, Pape et al. further teaches including conductor contact points (Fig. 1, #43) that are inserted in the vias (Col. 3, line 59).

***Allowable Subject Matter***



23. Claim 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. Claim 12 is allowable over prior art of record because the prior art does not teach or suggest a "device" with a "hinge" and with "input" and "output" vents, a "power connector", and a "printed circuit board" with "holes".

### ***Response to Arguments***

24. Applicant's arguments with respect to claims 1-11 and 14-20 have been considered but are moot in view of the amended claims and revised prior art search.

Claim 12, although rewritten in independent form by incorporating the limitations of original claims 10 and 11, failed to address the indefinite language of the original claim.

### ***Conclusion***

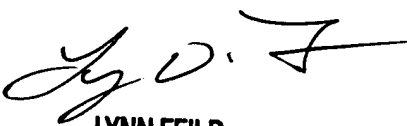
25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hamburgien (US 4,839,774) and Jairazbhoy (US 2003/0226688) teach vias for air flow in a printed wiring board. Minich et al. teaches a power connector with an air inlet and exhaust on opposite faces of the connector.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert J. Hoffberg whose telephone number is (571) 272-2761. The examiner can normally be reached on 8:30 AM - 4:30 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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